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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Jiandong Huang et al.

Title: SOFTWARE-BASED FAULT-TOLERANT NETWORKING USING A SINGLE LAN

Docket No.:	H26156.59388	Serial No.:	09/751,945
Filed:	December 29, 2000	Due Date:	October 1, 2006
Examiner:	Bunjob Jaroenchonwanit	Group Art Unit:	2143

MS Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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SUBSTITUTE APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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Filed: December 29, 2000	Docket: H26156.59388

For: SOFTWARE-BASED FAULT-TOLERANT NETWORKING USING A SINGLE LAN

SUBSTITUTE APPEAL BRIEF UNDER 37 CFR § 41.37

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Appeal Brief is presented in support of the Notice of Non-Compliant Appeal Brief mailed September 1, 2006 and the Notice of Appeal to the Board of Patent Appeals and Interferences, filed on December 29, 2003, from the Final Rejection of claims 1-33 of the above-identified application, as set forth in the Final Office Action mailed on July 24, 2003.

Appellants believe that no fee is due at this time. However, if a fee is required, the Commissioner of Patents and Trademarks is hereby authorized to charge Deposit Account No. 19-0743 to cover the requisite fee. The Appellants respectfully request consideration and reversal of the Examiner's rejections of pending claims.

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1. REAL PARTY IN INTEREST

The real party in interest of the above-captioned patent application is the assignee, HONEYWELL INTERNATIONAL INC..

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present appeal.

3. STATUS OF THE CLAIMS

Claims 1-33 are pending in the present application, and stand under Final Rejection.

Claims 1-33 were rejected under 35 USC § 112 as failing to teach how to make or use the invention.

Claims 1-4, 12-15, and 23-26 were rejected under 35 USC § 102(e) as being anticipated by Bruck et al. (U.S. Patent No. 6,088,330).

Claims 5-11, 16-22 and 27-33 were rejected under 35 USC § 103(a) as being unpatentable over Bruck et al., in view of Okanoue et al. (U.S. Patent No. 5,925,137).

4. STATUS OF AMENDMENTS

Claims 1, 12, and 23 have been amended in prosecution to more clearly reflect which elements of the claims perform which functions. No amendments are pending.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention provides in various claimed embodiments a method (Claim 1), a machine-readable medium having instructions for performing a method (Claim 23), and network interface (Claim 12) operable to manage the state of a computer network (see Fig. 1) comprising fault-tolerant network nodes (see 104-106 of Fig. 1, p. 5, ln. 14-21).

Claim 1 recites determining in each fault-tolerant node the state of a first link between each of the fault-tolerant nodes and other network nodes; determining in each fault-tolerant node the state of a second link between each of the fault-tolerant nodes and other network nodes (see 104-106 of Fig. 1, p. 5, ln. 14-21); receiving data from an originating node in a first fault-tolerant intermediate node (p. 6, ln. 17-24; Fig. 3 at 309); and selecting in the first fault-tolerant intermediate node either the first link or the second link from the first fault-tolerant intermediate node to a destination node for sending data, wherein the first link and second link comprise links other than directly to the originating node, such that the link is selected based on the network states determined independently for each fault-tolerant node (see Fig. 3, 306-309; Fig. 1, 104; p. 6, ln. 17-24; p. 5, ln. 14-21).

Claim 12 recites a fault-tolerant computer network interface, the interface operable to determine the state of a first link between the interface and other network nodes; determine the state of a second link between the interface and other network nodes (see 104-106 of Fig. 1, p. 5, ln. 14-21); receive data from an originating node (see p. 5, ln. 21-23); and select either the first link or the second link from the interface to a destination node for sending data, wherein the first and second links are links other than directly to the originating node, such that the link is selected based on the determined state of each link (see example, p. 7, ln. 12-20; see also see Fig. 3, 306-309; Fig. 1, 104; p. 6, ln. 17-24; p. 5, ln. 14-21).

Claim 23 recites machine-readable medium with instructions thereon, the instructions when executed operable to cause a computerized system operating as a fault-tolerant node in a network to determine the state of a first link between the computerized system and other network nodes; determine the state of a second link between the computerized system and other network nodes (see 104-106 of Fig. 1, p. 5, ln. 14-21); receive data from an originating node(see p. 5, ln.

21-23); and select either the first link or the second link from the computerized system to a destination node for sending data, wherein the first link and second link comprise links other than directly to the originating node, such that the link is selected based on the determined state of each link(see example, p. 7, ln. 12-20; see also see Fig. 3, 306-309; Fig. 1, 104; p. 6, ln. 17-24; p. 5, ln. 14-21).

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Claims 1-33 were rejected under 35 USC § 112 as failing to teach how to make or use the invention.

II. Claims 1-4, 12-15, and 23-26 were rejected under 35 USC § 102(e) as being anticipated by Bruck et al. (U.S. Patent No. 6,088,330).

III. Claims 5-11, 16-22 and 27-33 were rejected under 35 USC § 103(a) as being unpatentable over Bruck et al., in view of Okanoue et al. (U.S. Patent No. 5,925,137).

7. ARGUMENT

1) The Applicable Law

To comply with 35 U.S.C. §112, first paragraph, the Court held in *In re Gunn* (537 f.2d 1123, 1129 (CCPA 1976) that the invention disclosure must adequately teach one skilled in the art how to make or use the invention without undue experimentation. The court held that an electrical circuit diagram containing block diagrams with functional labels that failed to disclose interconnection, timing, or other operation between the blocks to obtain the specific operation desired, and therefore failed to meet this disclosure requirement.

To sustain a rejection under 35 U.S.C. §102(e), disclosure of each element of the claims under consideration must be shown in a single prior art reference. *In re Dillon* 919 F.2d 688, 16 USPQ2d 1897, 1908 (Fed. Cir. 1990) (en banc), cert. denied, 500 U.S. 904 (1991). "The identical invention must be shown in as complete detail as is contained in the ... claim."

Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP § 2131. Further, the elements must be arranged as recited in the claims under consideration. "Anticipation requires the presence in a single prior reference disclosure of each and every element of the claimed invention, *arranged as in the claim*." *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)) (emphasis added).

Similarly, to sustain a rejection under 35 U.S.C. § 103(a), the reference or references when combined must teach or suggest all the claim elements. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)).

2) Discussion of the Rejections

I. Whether Claims 1-33 were rejected under 35 USC § 112 as failing to teach how to make or use the invention.

The specification was objected to under 35 U.S.C.112, first paragraph, as failing to adequately teach how to make or use the invention. Applicant respectfully points out that Figure 1 and 3 specifically, and the accompanying text descriptions, teach explicitly how data may be routed through intermediate nodes or switches (*see, e.g.,* 309 of Figure 3) as it travels from the originating node to the destination node, without returning to the originating node.
The Office Action (paper 11) mailed 6/25/ 2003 argues that the disclosure did not teach the description of a first link and second link in a first fault-tolerant node comprising links other than directly to the originating node, as is recited as a claim limitation in claims such as Claim 1.

Several examples of such are given in the specification, such as on p. 7, ln. 12-20, which describes how data may be routed through an intermediate link to a destination node through other than the originating node.

Consider in Figure 1, as a further example, FTE node 4 as an originating node, and FTE node 3 as a destination node. Following the method taught in the specificaiton and illustrated in the flowchart of Figure 3, a message is received in the first fault-tolerant node switch 2 (103),

and is forwarded to FTE node 3 via either the first link direct connection to FTE node 3 or via the second link through Switch 1 (102) and then to an alternate connection to FTE node 3. Neither of these links are directly to the originating node, but are to other intermediate nodes or to the desination node.

The disclosure therefore repeatedly discloses the function of example nodes, interaction between various nodes, and illustrates examples of interconnections between nodes. Because the apparatus is shown in Figure 1, and the function of various elements is extensively described in the specification as discussed above, this claim limitation is fully disclosed and enabled by the specification and drawings. Reversal of the 35 U.S.C. §112 rejection of claims 1-33 is therefore respectfully requested.

II. Claims 1-4, 12-15, and 23-26 were rejected under 35 USC § 102(e) as being anticipated by Bruck et al. (U.S. Patent No. 6,088,330).

Bruck describes a computing node array having two network switches (110 and 112). Each of the nodes is connected to both of the switches, which are the only elements taught to perform any switching or the routing of data between nodes or to perform other such network functions.

In the present invention, the fault-tolerant nodes themselves are taught to determine the state of links to other network nodes, and to perform link selection for routing data to other nodes. Claim 1, for example, specifically recites "determining in each fault tolerant node the state of a first link... ; determining in each fault tolerant node the state of a second link...", which is not taught by Bruck. Similar limitations are present in all other pending claims, and are not found nor are alleged to be present in Bruck.

Previous Office Actions (*see,e.g,* Paper 8), as well as the final rejection Office Action mailed 6/25/2003 (*see,* p. 4, ln. 1-2 of paper 11), explicitly admit not all elements of certain pending claims such as 3, 4, and 25 are present in Bruck. More specifically, the Office action admits that the non fault-tolerant node recited in claims 3, 14, and 25 is not present in Bruck. Further, these claims depend from claims believed to be allowable as described in greater detail above, and so are believed to be particularly well-suited for allowance.

Because the pending claims recite the function of determining the state of links to other nodes and selection of links, which is not present in Bruck, these claims are believed to be in condition for allowance. Reversal of the rejection of these claims, and of the claims that depend therefrom, is therefore respectfully requested.

III. Claims 5-11, 16-22 and 27-33 were rejected under 35 USC § 103(a) as being unpatentable over Bruck et al., in view of Okanoue et al. (U.S. Patent No. 5,925,137).

These claims are dependent on base claims believed to be in condition for allowance, as explained above in greater detail, and so are believed to be in condition for allowance as dependent on allowable base claims.

Further, to sustain a rejection under 35 U.S.C. §103(a), the cited references must teach or suggest all the claim elements. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir. 1991)). The Okanoue reference discusses only a ring network of devices having network connections lacking a routing protocol, and wherein nodes poll their ring neighbors for link status and maintain the results for links to neighbors only in a table . A message is then redirected around the ring if it reaches a fault in the ring network.

In contrast, the present invention teaches fault-tolerant nodes having specific structure and function, such that each maintains a status table indicating its communication capability with the other nodes in the network, and in which at least one of the intermediate nodes has at least a first link, a second link, and a link to an originating node, as is described in the pending claims.

Because the claims as amended are different in structure and function than are the systems in the cited references, the claims are believed to be in condition for allowance. Reversal of the rejection of these pending claims is therefore further respectfully requested.

8. SUMMARY

Applicant believes the claims are in condition for allowance, and request withdrawal of the rejections to the pending claims. It is respectfully submitted that the cited art fails to anticipate the present invention or to render it obvious, and that the claimed invention is therefore patentably distinct from the cited art. It is respectfully submitted that claims 1-33 should therefore be allowed, and reversal of the rejection of pending claims 1-33 is respectfully requested.

Respectfully submitted,

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Date Sep. 29 06 By

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Name

Signature

CLAIMS APPENDIX

1. A method of managing the state of a computer network comprising fault-tolerant network nodes, comprising:

determining in each fault-tolerant node the state of a first link between each of the fault-tolerant nodes and other network nodes;

determining in each fault-tolerant node the state of a second link between each of the fault-tolerant nodes and other network nodes;

receiving data from an originating node in a first fault-tolerant intermediate node; and

selecting in the first fault-tolerant intermediate node either the first link or the second link from the first fault-tolerant intermediate node to a destination node for sending data, wherein the first link and second link comprise links other than directly to the originating node, such that the link is selected based on the network states determined independently for each fault-tolerant node.

2. The method of claim 1, wherein the destination node is a fault-tolerant intermediate node.

3. The method of claim 1, wherein the originating node is a non-fault tolerant node.

4. The method of claim 1, wherein the first fault-tolerant intermediate node is a switch.

5. The method of claim 1, further comprising building an independent network status table in each fault-tolerant node that indicates results of determining the state of the first and second link between that node and other network nodes.

6. The method of claim 5, wherein the network status table comprises data representing network status based on data received at a fault-tolerant network node from other network nodes.

7. The method of claim 6, wherein the data received at a fault-tolerant network node from other networked nodes comprises a diagnostic message.

8. The method of claim 6, wherein data received at a fault-tolerant network node from other networked nodes comprises data representing the ability of the other fault-tolerant nodes to receive data from other different network nodes.

9. The method of claim 5, wherein the network status table comprises data representing network status based on a fault-tolerant node's ability to send data to other nodes.

10. The method of claim 6, wherein the network status table further comprises data representing network status based on a fault-tolerant node's ability to send data to other nodes.

11. The method of claim 1, wherein determining the state of a first and second link from fault-tolerant nodes comprises determining whether each node connected to a fault-tolerant node can send data to the fault-tolerant node and can receive data from the fault-tolerant node over each of the first and second links.

12. A fault-tolerant computer network interface, the interface operable to:
determine the state of a first link between the interface and other network nodes;
determine the state of a second link between the interface and other network nodes;
receive data from an originating node; and
select either the first link or the second link from the interface to a destination node for sending data, wherein the first and second links are links other than directly to the originating node, such that the link is selected based on the determined state of each link.

13. The fault-tolerant computer network interface of claim 12, wherein the destination node is a fault-tolerant intermediate node.

14. The fault-tolerant computer network interface of claim 12, wherein the originating node is a non-fault tolerant node.

15. The fault-tolerant computer network interface of claim 12, wherein the computer network interface comprises part of a switch.

16. The fault-tolerant computer network interface of claim 12, the interface further operable to build a network status table that indicates results of determining the state of the first and second link between the interface and other network nodes.

17. The fault-tolerant computer network interface of claim 16, wherein the network status table comprises data representing network status based on data received at the interface from other network nodes.

18. The fault-tolerant computer network interface of claim 17, wherein the data received at the interface from other networked nodes comprises a diagnostic message.

19. The fault-tolerant computer network interface of claim 17, wherein the data received at the interface from other network nodes comprises data representing the ability of the other fault-tolerant nodes to receive data from other different network nodes.

20. The fault-tolerant computer network interface of claim 16, wherein the network status table comprises data representing network status based on the interface's ability to send data to other nodes.

21. The fault-tolerant computer network interface of claim 17, wherein the network status table further comprises data representing network status based on the interface's ability to send data to other nodes.

22. The fault-tolerant computer network interface of claim 12, wherein determining the state of a first and second link from the interface comprises determining whether each node connected to the interface can send data to the interface and can receive data from the interface over each of the first and second links.

23. A machine-readable medium with instructions thereon, the instructions when executed operable to cause a computerized system operating as a fault-tolerant node in a network to:

determine the state of a first link between the computerized system and other network nodes;

determine the state of a second link between the computerized system and other network nodes;

receive data from an originating node; and

select either the first link or the second link from the computerized system to a destination node for sending data, wherein the first link and second link comprise links other than directly to the originating node, such that the link is selected based on the determined state of each link.

24. The machine-readable medium of claim 23, wherein the destination node is a fault-tolerant intermediate node.

25. The machine-readable medium of claim 23, wherein the originating node is a non-fault tolerant node.

26. The machine-readable medium of claim 23, wherein the computerized system is a switch.

27. The machine-readable medium of claim 23, the instructions when executed further operable to cause the computerized system to build a network status table that indicates results of determining the state of the first and second link between the computerized system and other network nodes.

28. The machine-readable medium of claim 27, wherein the network status table comprises data representing network status based on data received at the computerized system from other network nodes.

29. The machine-readable medium of claim 28, wherein the data received at the computerized system from other networked nodes comprises a diagnostic message.

30. The machine-readable medium of claim 28, wherein the data received at the computerized system from other network nodes comprises data representing the ability of the other fault-tolerant nodes to receive data from other different network nodes.

31. The machine-readable medium of claim 27, wherein the network status table comprises data representing network status based on the computerized system's ability to send data to other nodes.

32. The machine-readable medium of claim 28, wherein the network status table further comprises data representing network status based on the computerized system's ability to send data to other nodes.

33. (Original) The machine-readable medium of claim 23, wherein determining the state of a first and second link from the computerized system comprises determining whether each node connected to the computerized system can send data to the system and can receive data from the system over each of the first and second links.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.